

Dr. M. Foster, Prof. Oliver, Dr. Hort, Dr. Phear (Master of Emmanuel College), Rev. G. F. Browne, and Rev. M. J. Berkeley.

Woodwardian Professorship of Geology: Prof. Prestwich (Oxford), Rev. E. Hill, Mr. W. H. Hudleston, Mr. A. Geikie (Director of Geological Survey), Dr. Phear, Mr. R. D. Roberts, Mr. Ewbank, and Prof. A. Newton.

Professorship of Zoology and Comparative Anatomy: Prof. Flower, Prof. Moseley (Oxford), Dr. M. Foster, Prof. Huxley, Mr. J. W. Clark, Dr. F. Darwin, Prof. Humphry, and Mr. D. McAlister.

The Woodwardian Professor has been authorised to apply a sum equivalent to the late Assistant's stipend in payment of Demonstrators for this and the next term.

The regulations for the degrees of Doctor in Science and Doctor in Letters have been confirmed, with minor modifications.

The additional mathematical examination of candidates for honours in the "Little Go" is to be discontinued; Elementary Logic is to be hereafter allowed as a substitute for Paley's Evidences; Euclid is to be limited to the more useful propositions; algebra is to be increased in quantity; and the examination is to be held three times a year, the additional time being at the beginning of October.

The subject for the next Sedgwick Prize Essay, 1885, is "The Jurassic Rocks of the Neighbourhood of Cambridge."

The last Report of the Mathematical Board recommends that the Moderators and Examiners shall be the adjudicators of the Smith's Prizes, and that the Smith's Prizes be awarded on the results of Part III. of the Mathematical Tripos. This would give more distinction to the examination in the higher subjects. The concurrence of Professors Stokes, Adams, and Cayley in this recommendation is a strong point in its favour.

The report of the Moderators and Examiners in the last Mathematical Tripos, the first under the new system, gives particulars about Part III., to which only the Wranglers are admitted. Of the twenty-nine Wranglers, sixteen presented themselves for Part III., of whom two were not finally classed. In order to give opportunity to a candidate who had confined his reading mainly to one group of the higher subjects to employ his whole time in questions in that group, the examiners in the five bookwork papers gave at least four questions in each group which came into the paper, and fixed five as the limit of questions to be answered. In the fifth paper, subjects for essays were chosen from each group. The majority of candidates attempted too many subjects, and their answers as a rule were poor and meagre. The Examiners are far from satisfied with the average performance of the candidates in Part III., but they expect better results when the new system is better understood, especially the encouragement given to limiting reading in the higher subjects to one or two groups.

FREE admission to the lectures and courses of practical instruction in the Normal School of Science and Royal School of Mines at South Kensington and Jermyn Street will be granted to a limited number of Teachers and Students of Science Classes under the Science and Art Department, who intend to become Science Teachers. The selected candidates will also receive a travelling allowance, and a maintenance allowance of twenty-one shillings per week while required to be present in London. The courses given and the duration of each are as stated below:—Chemistry: Part I., October to February; Parts II. and III., October to June. Physics: Part I., October to February; Parts II. and III., October to June. Biology: October to June. Geology: Part I., February to June; Part II., October to February. Mechanics: Part I., February to June; Parts II. and III., October to June. Metallurgy: October to June. Mining: October to June. Agriculture: October to January. Attendance is required from 9 or 10 a.m. to 4 or 5 p.m. daily, in addition to the time necessary in the evening for writing up notes, &c. Students will be required to attend the Classes for Mathematics, Geometrical Drawing, and Freehand Drawing, so far as may be considered necessary. Candidates for these Studentships must send in their applications before May 31, on Science Form No. 400, copies of which may be obtained on application to the Secretary, Science and Art Department, South Kensington. When the same student is a candidate for more than one course, the order of preference should be given. It should, in all cases, be stated for which course or courses the student is a candidate.

SCIENTIFIC SERIALS

American Journal of Science, February.—Henry Draper, by G. F. B.—Fauna at the base of the Chemung group in New York, by H. S. Williams.—Geological chemistry of Yellowstone National Park.—Geyser waters and deposits, by H. Leffmann.—Rocks of the Park, by W. Beam.—Electromagnetic theory of light; general equations of monochromatic light in media of every degree of transparency, by J. W. Gibbs.—The rainfall in Middletown, Connecticut, from 1859 to 1882, by H. D. A. Ward.—Discoveries in Devonian Crustacea, by J. M. Clarke.—Observations of the transit of Venus, 1882, made at the Lick Observatory, by D. P. Todd.—The antennæ of Meloe, by F. C. Hill.—Hypersthene-Andesite, by W. Cross.—Method for determining the collimation constant of a transit circle, by M. Schaeberle.

The American Naturalist, December, 1882, contains:—A pilgrimage to Teotihuacan, by R. E. Hills.—On the grey rabbit (*Lepus sylvaticus*), by Samuel Lockwood.—The Palæozoic allies of Nebalia, by A. S. Packard, jun.—American work on recent mollusca in 1881, by W. H. Dall.—The organic compounds in their relations to life, by L. F. Ward.—The reptiles of the American Eocene, by E. D. Cope.

January, 1883, contains:—The history of anthracite coal in nature and art, by Jas. L. Lippincott.—The development of the male prothallium of the field horse-tail, by D. H. Campbell.—On the geological effects of a varying rotation of the earth, by J. E. Todd.—On the bite of the North American coral snakes (*Elaps*), by F. W. True.—Achenial hairs and fibres of Composite, by G. Macloskie.—Instinct and memory exhibited by the flying squirrel in confinement, with a thought on the origin of wings in bats, by F. G. King.—The extinct Rodentia of North America, by E. D. Cope.

February, 1883, contains:—The Kindred of Man, by A. E. Brown.—Indian Stone Graves, by C. Rau.—On organic physics, by C. Morris.—The mining regions of Southern New Mexico, by F. M. Endlich.—The extinct Rodentia of North America, by E. D. Cope.—Spencer and Darwin.—The Beastarians.

Annaen der Physik und Chemie, No. 2.—The electric conductivity of some cadmium and mercury salts in aqueous solutions by D. Grotrian.—On the change of the double refraction of quartz by electric forces, by W. C. Röntgen.—On the optical behaviour of quartz in the electric field, by A. Kundt.—On the function of magnetisation of steel and nickel, by H. Meyer.—Contributions to the history of recent dynamo-electric machines, with some remarks on determination of the degree of action of electromagnetic motors, by A. von Waltenhofen.—On the viscosity of salt solutions, by S. Wagner.—Researches on the absorption of gases by liquids under high pressures, by S. v. Wroblewski.—Strecker's memoirs on the specific heat of gaseous biatomic compounds of chlorine, bromine, iodine, &c., by L. Boltzmann.—On the luminosity of flames, by W. Siemens.—Distillation in vacuum, by A. Schuller.—Researches on the elasticity of crystals of the regular system, by K. R. Koch.—On absolute measures, by C. Bohn.—Correction of the method adopted by R. Kohlrausch in his researches on contact-electricity, by E. Gerland.—The volume-change of metals in melting, by F. Nies and A. Winkelmann.—Correction, by A. Guebhard.

SOCIETIES AND ACADEMIES LONDON

Royal Society, February 22.—"Preliminary Note on the Action of Calcium, Barium, and Potassium on Muscle." By T. Lauder Brunton, M.D., F.R.S., and Theodore Cash, M.D.

It has been shown by Ringer that calcium prolongs the contraction of the frog's heart. This prolongation is diminished by the subsequent addition of potash.

It occurred to us that calcium and potassium salts might exercise a similar action on voluntary muscle. On trying it we found this to be the case. Calcium in dilute solution prolongs the duration of the contraction in the gastrocnemius of the frog. Potassium salts subsequently applied shorten the contraction. We have been led to try the effect of barium on muscle by considerations regarding the relations of groups of elements, according to Mendelejeff's classification, to their physiological action. These considerations we purpose to develop in another paper. The effect of barium is very remarkable. It produces a curve

very much like that caused by veratria, both in its form and in the modifications produced in it by repeated stimuli. We have found that the veratria curve is restored by potash to the normal in the case of the gastrocnemius, just as Ringer found it in the case of the frog's heart. The peculiarity which barium produces in the gastrocnemius is also abolished by potash. We have tested a number of other substances belonging to allied groups, and find that some of them have a similar, though not identical, action with barium. The results of these experiments, as well as the general considerations to which we have already alluded, we purpose to discuss in another paper.

"On the Formation of Uric Acid in the Animal Economy, and its Relation to Hippuric Acid." By Alfred Baring Garrod, M.D., F.R.S.

The paper is divided into an introduction and three parts. The introduction contains the results of a series of experiments upon the solubility of uric acid and its most important salts, at the temperature of the body; and upon the effects of mixing the urates of sodium and ammonium with the phosphates and chlorides of the same bases.

Part I. contains observations upon the physical and microscopic characters of the urinary excretions of birds, reptiles, and some invertebrates, as well as chemical investigations of such excretions, and of the blood of the same classes of animals, with a view to the detection therein of uric acid. Part II. deals with the formation of uric acid in the animal economy. The rival theories are discussed, and from the consideration of the very large quantities of uric acid, in proportion to the body-weight, excreted by many of the lower animals, as well as the inability of the kidneys to excrete uric acid which has been taken by the mouth or injected into the blood, the author is led to the opinion that the uric acid is a product of changes which take place in the kidneys itself, and is not merely filtered off from the blood. This view receives further support from the fact that, whilst the kidneys excrete ammonium urate, uric acid when found in the blood is in the form of the more stable sodium urate.

It is further shown that when solutions of hippurates are mixed with solutions of urates, the salts exert an influence upon each other, and details of experiments to demonstrate this action are embodied in an appendix.

Linnean Society, February 15.—Sir John Lubbock, Bart., F.R.S., president, in the chair.—Mr. Jenner Weir exhibited a perfect hermaphrodite butterfly (*Lycanea icarus*), and a blue male and brown female of the same species for comparison. The hermaphrodite in question possesses two spotless blue wings on the left, and two spotted brown wings on the right, thus being intermediate in colour between the two sexes.—Dr. W. C. Ondaatje exhibited a collection of thirty species of Ceylon corals, of which twenty were of a stony character. The series agree in the main with those of the Indian fauna; four are new species, viz. two of *Caloria*, one of *Pavonia*, and one of *Alcyonium*, the two latter however showing most affinity to forms met with in islands of the Pacific Ocean.—Mr. T. Christy called attention to examples of Carnauba palm leaves and to the wax of the tree; and he also showed specimens of a hybrid *Primula* (*P. japonica* and *P. sinensis*) with double whorls of flowers.—Mr. J. G. Baker read his third contribution to the flora of Madagascar. In this he gives descriptions of the new Incompletæ and Monocotyledons contained in the collections recently made in Madagascar by the Rev. R. Baron and Dr. G. W. Parker. The only new genus is *Cephalophyton*, a Balanophorad used in medicine, of which the material is not complete. Most of the new species belong to widely spread tropical genera, such as *Ficus*, *Loranthus*, and *Croton*. Cape types are represented by *Fauria*, *Peddiea*, *Dais*, *Kniphofia*, and *Dipcadi*, one species of each, and by four *Aloes*. Of *Obetia*, a genus of arborescent stinging-nettles known only in Madagascar and the neighbouring islands, there are four new species. The Bamboo common in the woods of Imerina proves to be conspecific with that of the interior of Bourbon. There is a curious *Exocarpus* with phyllocladea, nearly allied to species from Norfolk Island and the Malay archipelago.—Mr. C. B. Clarke has contributed a complete synopsis of all the species of *Cyperus* known in Madagascar and the neighbouring islands.—Mr. George Murray read a paper on the outer peridium of *Broomeia*. This gasteromycetous fungus, which is nearly related to *Geaster* consists of a mass of individuals closely seated together on a corky stroma. These individuals have been found up till now with only one peridium, and the Rev. Mr. Berkeley, who first described the plant in 1844, treated the stroma as the

homologue of an outer peridium. Mr. Murray has found on some specimens recently brought from Dammara Land a true outer peridium common to all the individuals. From an examination of it he is able to throw light on the mode of development of this fungus.—A paper was read on the "Manna" or Lerp insect of South Australia, by Mr. J. G. Otto Tepper. This contained observations on the insect in question and on the peculiar saccharine substance derived from it, which is deposited on Eucalypti trees.—Mr. W. B. Hemsley read a communication on the synonymy of *Didymoplexis*, and on the elongation of the pedicle of *D. pallens*. The latter saprophyte orchid is widely scattered in tropical Asia, though apparently nowhere very common. It is remarkable for the elongation of its pedicles after flowering. At the time of flowering the pedicles are shorter than the flowers, which are less than half an inch long; but afterwards they elongate, sometimes as much as a foot. The object seems to be to carry the ripening fruit clear of the wet decaying vegetable matter in which the plant grows.

Zoological Society, February 20, W. H. Fowler, F.R.S., president, in the chair.—Prof. F. Jeffrey Bell exhibited a selection of microscopical preparations received from the Zoological Station at Naples, and made some remarks upon them.—Mr. J. J. Weir exhibited and made remarks on an apparently hermaphrodite specimen of *Lycanea icarus*.—Mr. Sclater gave an account of the birds collected by Mr. H. O. Forbes, F.Z.S., during his recent expedition to Timor Laut, and exhibited the specimens. The species were fifty-five in number, sixteen of which were described as new to science under the following names:—*Ninox forbesi*, *Strix sororcula*, *Tanygnathus subaffinis*, *Geoffroius tenimberensis*, *Monarcha castus*, *Monarcha mundus*, *Rhipidura hamadryas*, *Myiagra fulviventris*, *Microca hemixantha*, *Grauculus unimodus*, *Lalage mesta*, *Pachycephala arctitorquis*, *Dicaeum fulgidum*, *Myzomela annabella*, *Calornis crassa*, and *Megapodus tenimberensis*. The general facies of the avifauna as thus indicated was stated to be decidedly Papuan, with a slight Timorese element, evidenced by the occurrence of certain species of the genera *Geocichla* and *Erythura*; while the new owl (*Strix sororcula*) was apparently a diminutive form of a peculiar Australian species.—Prof. F. Jeffrey Bell read the second of his series of papers on the Holothuroidea. The present communication contained the descriptions of some new species which the author had discovered while examining the specimens of this group contained in the collection of the British Museum.—Dr. Hans Gadow read a paper on the suctorial apparatus of the Tenuirostres, pointing out that the tubular structure of the tongue in this group is produced by the over-growth of the horny lingual sheath, the edges of which curl upwards and inwards.—A paper was read by Mr. L. Taczanowski, C.M.Z.S., Curator of the Museum at Warsaw, in which he gave the descriptions of some new species of birds in the collection made by Dr. Raimondi during his recent explorations in Peru. The species in question were seven in number, belonging to six genera, namely, *Carenochrous seebohmi*, *C. dresseri*, *Phytotoma raimondi*, *Ochthaea jelskii*, *Upucerthia pallida*, *Cyanthus griseiventris*, and *Pittacula crassirostris*.—Mr. Taczanowski also read a communication from Dr. Dybowski, in which the sexual differences between the skulls of *Rhytina stelleri* were pointed out.—A communication was read from Mr. G. B. Sowerby, jun., containing the descriptions of nine new species of shells and of the opercula of two known species.

Entomological Society, February 7.—J. W. Denning, M.A., F.L.S., president, in the chair.—Two Members and one subscriber were elected.—Mr. J. R. Billups exhibited a species of *Conocephalus* which was found in a greenhouse at Lee and kept alive some time.—Mr. F. P. Pascoe read some comments on a letter recently contributed to NATURE by the Duke of Argyll, respecting a moth observed by him at Cannes.—Mr. E. A. Fitch exhibited three species of *Hymenoptera* from Ambarawa, Sumatra.—M. L. Peringuey communicated notes on the habits of three species of *Paussus* observed by him at the Cape of Good Hope.

Mineralogical Society, February 15.—Mr. W. H. Huddleston, F.G.S., president, in the chair.—Prof. Church exhibited and described a specimen of siliceous matter obtained by Mr. Vicary from the Upper Greensand of Haldon, which contained 98 per cent. of silica.—The President then read a paper on a recent hypothesis with respect to the diamond rock of South Africa. A discussion ensued in which Profs. Rupert Jones, John Morris, and Church took part.—A paper from Mr. J. H.

Collins was read on the minerals of Rio Tinto. The President, Prof. Morris, and Mr. Kitto joined in the discussion.

Meteorological Society, February 21.—Mr. J. K. Laughton, F.R.A.S., president, in the chair.—Rev. W. R. C. Adamson, R. P. Colman, W. F. Gwinnell, Capt. C. S. Hudson, T. Mann, F. G. Treharne, and W. Tyson, were elected Fellows.—The following papers were read:—Notice of a remarkable land fog bank, “the Larry,” that occurred at Teignmouth on October 9, 1882, by G. W. Ormerod, M.A., F.M.S. The “Larry” is a dense mass of rolling white land fog, and is confined to the bottom of the Teign Valley, differing therein from the sea fog which rises above the tops of the hills; it appears about day-break, and has an undulating but well-defined upper edge, which leaves the higher part of the hillsides perfectly clear. The author gives an account, illustrated by photographs, of the remarkable fog bank that occurred at Teignmouth on the morning of October 9.—Barometric depressions between the Azores and the continent of Europe, by Capt. J. C. de Brito Capello, Hon. Mem. M.S. The author gives the tracks of several depressions from the Azores to Europe, and shows that if there had been a telegraphic cable, nearly every one of them could have been foretold in England.—Weather forecasts and storm warnings on the coast of South Africa, by Capt. C. M. Hepworth, F.M.S.—Note on the reduction of barometric readings to the gravity of latitude 45° , and its effect on secular gradients, and the calculated height of the neutral plane of pressure in the tropics, by Prof. E. D. Archibald, M.A., F.M.S.

Physical Society, February 24.—Prof. Clifton in the chair.—New members: Prof. A. W. Scott, M.A., Mr. F. E. M. Page, B.Sc.—Mr. Lewis Wright read a paper on the optical combinations of crystalline films, and illustrated it by experiments. He exhibited the beautiful effects of polarisation of light and the Newtonian retardation by means of plates built up of thin mica films and Canada balsam. The wedges thus formed gave effects superior to those of the more expensive selenite and calcite crystals. The original use of such plates is due to Mr. Fox, but Mr. Wright showed many interesting varieties of them, including what he termed his “optical chromotrope,” formed by superposing a concave and $\frac{1}{4}$ wave-plate on each other. Noreberg’s combined mica and selenite plates were also shown. Mr. Spottiswoode praised the results very highly, and pointed out their value to the teacher and student as showing how the effects can be produced step by step. The phenomena can be shown by an addition to the ordinary microscope, costing some two guineas, as made by Messrs. Swift and Sons.—Mr. Braham then gave an experimental demonstration of the vortile theory of the solar system by rotating a drop of castor oil and chloroform in water until it threw off other drops as planets.

EDINBURGH

Royal Society, February 19.—Mr. A. Forbes Irvine in the chair.—Mr. G. Auldjo Jamieson read a long and interesting paper on land tenure in Scotland in the olden time, in which the author, after describing in detail the various ancient systems and the survivals of them that exist even now in different parts of the country, strongly deprecated the position taken by some that a return to the old systems would be beneficial.—Prof. Rutherford, in a paper on the microscopical appearances of striped muscular fibre during relaxation and contraction, maintained that the views held generally by physiologists as to which is the contractile portion of the fibre were quite erroneous. A great deal of the inconsistency that seemed to exist was due to difference in the appearance of muscular fibre according as it was relaxed or contracted; and previous observers had been unable to explain this simply because they had not hit upon an effective method of preserving the fibre in either condition. The paper was illustrated by enlarged diagrams and by microscopical preparations of the fibres in various conditions.

BERLIN

Physiological Society, February 9.—Prof. du Bois Reymond in the chair.—Dr. Walten, who was present as a visitor, gave a detailed account of his experiments upon the power of hearing in hysterical, hemianæsthetic persons. He has determined the presence of different degrees of deafness, in cases of partial and complete hemianæsthesia, in addition to the manifold motor and sensory hyperæsthesias and anæsthesias. In all cases anæsthesia of the external auditory meatus and of the membranum tympani existed on the affected side; the lesser

degrees of deafness manifested themselves in the same way that senile deafness sets in, *i.e.* in interference with the propagation of sounds through the cranial bones, while direct hearing by the ear was still normal. When a higher degree of hysterical deafness was present, high tones could not be perceived by the ear. In extreme cases deafness is absolute on the affected side. All degrees of uni-lateral hysterical deafness could, like the remainder of the manifestations of hemianæsthesia, be transferred to the healthy side through the operation of a powerful magnet. Dr. Walten was able to measure the gradual decrease of deafness on the affected side and its gradual increase on the healthy side.—Dr. Martius, reasoning by analogy from the fact that a frog’s heart cannot contract unless it is bathed in a nutritive fluid, from which it takes the energy required for its work, has tried to determine by experiment if other organs, *e.g.* the brain, require a continual supply of a nutritive fluid in order to keep up their activity. He therefore replaced the blood of frogs by a neutral salt-solution of the strength of 0.6 per cent., with which he washed out the blood-vessels until the fluid ran off free from blood, and as clear as water, and he observed the functions of the central nervous system in these frogs (salt-frogs). It was, however, soon discovered that all the blood had not been removed from the body by driving salt-solution through once, because, when the process was repeated after a few hours’ time, the fluid flowed off deeply coloured with blood, and this process had to be renewed very frequently before the blood was reduced to a minimum. Hence, in the experiments with “salt-frogs,” the brain was supplied by blood that was more and more diluted, and it reacted as follows:—After washing out the vessels once with salt-solution, the frog behaved like a brainless frog behaves. It sat still and did not make any spontaneous movements; it breathed normally, and exhibited the croak-reflex to perfection. After the vessels had been washed out twice, the croak-reflex had disappeared, and breathing was irregular and intermittent; finally, when the blood was still further diluted, respiration entirely ceased and the general reflex-irritability was greatly increased, as in frogs whose spinal cord is separated from their medulla oblongata. The conclusion to be drawn is that the brain, as well as the heart, requires the presence of a nutritive fluid from which it abstracts the energy for its work. The frogs that were operated upon recovered perfectly from the first stage in a few days’ time, but did not recover from the later stages. It is evident that they bore the transfusion of such large quantities of salt-solution very well. On the other hand, they could not be used for experiments upon blood-transfusion, because they died even after very moderate transfusions of blood from other animals.

GÖTTINGEN

Royal Society of Sciences, December 27, 1882.—On an onyx cameo not hitherto known, with a replica of the representations on the upper and middle layers of the large Paris cameo of La Sainte Chapelle, by F. Wiegeler.

CONTENTS	PAGE
THE ORIGIN OF CULTIVATED PLANTS	429
OUR BOOK SHELF:—Rankine’s “Useful Rules and Tables relating to Mensuration, Engineering, Structures, and Materials”	431
LETTERS TO THE EDITOR:—Mr. Stevenson’s Observations on the Increase of the Velocity of the Wind with the Altitude.—THOMAS STEVENSON	432
The Supposed Coral-eating Habits of Holothurians.—W. SAVILLE KENT	433
Influence of a Vacuum on Electricity.—A. M. WORTHINGTON (With Illustration)	434
The Meteoroid of November 17, 1882.—H. DENNIS TAYLOR	434
A Meteor.—R. W. S. GRIFFITH	434
Aurora.—JOSEPH JOHN MURPHY	434
Hovering of Birds.—DR. J. RAE, F.R.S.	434
AMATEURS AND ASTRONOMICAL OBSERVATION. By W. F. DENNING	434
ON THE NATURE OF INHIBITION, AND THE ACTION OF DRUGS UPON IT, II. By DR. T. LAUDER BRUNTON, F.R.S. (With Illustrations)	436
THE SHAPES OF LEAVES, I. By GRANT ALLEN (With Illustrations)	439
HERRING AND SALMON FISHERIES	442
NOTES	443
OUR ASTRONOMICAL COLUMN:—The Comet 1883 a	445
The Great Comet of 1882	446
The Variable Star U Cephei	446
New Nebulae	446
GEOGRAPHICAL NOTES	446
THE CONSERVATION OF EPPING FOREST FROM THE NATURALISTS’ STANDPOINT. By RAPHAEL MELDOLA	447
UNIVERSITY AND EDUCATIONAL INTELLIGENCE	449
SCIENTIFIC SERIALS	450
SOCIETIES AND ACADEMIES	450